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ABSTRACT

THIRTY BILINGUAL HISPANCAMERICAN STUDENTS BETWEEN THE AGES OF EIGHT AND THIRTEEN WERE GIVEN VERBAL AND NON-VERBAL INTELLIGENCE TESTS WHICH WERE THEN CORRELATED WITH OVERALL SCHOOL GRADE POINT AVERAGE. NON-VERBAL TESTS RESULTED IN HIGHER CORRELATIONS; THE RAVEN COLORED PROGRESSIVE MATRICES APPEARED TO BE THE BEST PREDICTOR OF SCHOOL SUCCESSES OF THESE CHILDREN. FOLLOWING THESE RESULTS IT WAS HYPOTHESIZED THAT PERCEPTUAL-MOTOR SKILLS WERE USED BY THESE CHILDREN IN SOME WAY TO ACCOMPLISH VERBAL ACTIVITIES.
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Test Prediction of School Success of Bilingual Hispanoamerican Children

M. J. Philippus, PH. D.

Summary

Thirty bilingual Hispanoamerican students between the ages of eight and thirteen were given verbal and non-verbal intelligence tests which were then correlated with overall school grade point average. Non-verbal tests resulted in higher correlations and the Raven Coloured Progressive Matrices appeared to be the best predictor of school success of these children.

In light of these results it was hypothesized that perceptual-motor skills were used by these children, in some way, to accomplish verbal activities.

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TEST PREDICTION OF SCHOOL SUCCESS OF BILINGUAL HISPANOAMERICAN CHILDREN*

M. J. Philippus, PH. D.

Introduction and Background

In mid-October of 1967, Mental Health Team V of the Department of Psychiatry, Denver Department of Health and Hospitals was decentralized from the Denver General Hospital and placed temporarily in a housing project in West Denver. This location was in anticipation of the opening of Denver's second neighborhood health center of which Mental Health Team V is an integral part. This placement of the Team (and the subsequent area location of the second neighborhood health center) falls in a section of Denver that is heavily populated by a Spanish-Surnamed minority group. Schools in this area contain from seventy-five to eighty-five percent of children of Hispanoamerican descent.

From the first contact in this section of Denver a certain problem group began to be referred to us which ultimately became the focus of this study. This group was of mostly Hispano origin between the ages of eight and thirteen and were usually referred because of initial behavioral or emotional problems.

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However, in our subsequent contact with these children it became apparent that whatever their referral reason, their difficulties were complicated by general learning problems which appeared to be exacerbated by their bilingualism. The question of bilingualism has been the subject of investigation by many researchers over the years (9,11,14) though for the most part these investigations have necessarily been descriptive or have emphasized the differences between Hispanoamerican and Angloamerican cultures. Usually these studies employed intelligence and other psychological tests and pointed out how poorly the Hispano did on such tests. In the testing of these individuals by Mental Health Team V, it became quite obvious that differences did occur which were not described in existing literature. For example, an invariable test result was that these children would score low on the Verbal I.Q. of the Wechsler Intelligence Scale for Children but would usually score higher on the Performance I. Q. In addition, a study conducted on similar children at Porter Memorial Hospital indicated confirmatiion of reduced verbal functions on the same test. However, in this latter study it was noted that these lowered verbal skills were not necessarily related to achievement in school. Thus it seemed that if it were possible to find some suitable way of evaluating these subjects in terms of school or even better some method of relating their skills to school performance, then we may be on the road to alleviate some of the

initial frustrating school experiences. If this were possible then an inroad into this complex problem area would have been made, and through subsequent studies possible approaches in school or therapy may be forthcoming. Necessarily this area of school prediction appeared to be the problem to attack first and the focus of this study then became the correlation of grade average with some verbal or non-verbal standardized test depending upon subsequent data.

Method

A. Selection of the Population

The population studied here consisted of thirty bilingual Hispanoamerican children ranging in age between eight and thirteen. Of this group eighteen were boys and twelve were girls. The criteria for bilingualism was based upon the ability of the subject to answer questions posed in Spanish by the investigator. These questions were simple queries about the family, school, food, and play activities. An additional factor was also included after the study began. As all subjects were accompanied to the testing sessions by their parents, the investigator would converse with the parents in Spanish during which time the parents were asked if Spanish was used in the home between parents and between members of the family.

These relatively simple minded criteria developed after several futile attempts were made to decide upon some measuring device to assess the amount of Spanish "culturalization" in the population to be studied. The Spanish-Surnamed population in Denver, Colorado, represents a group with tremendous variations in the use of Spanish and the type of idiomatic expressions employed. Consequently, within this group one will find individuals who speak no English at all, individuals who speak more or less both languages, and individuals who speak almost no Spanish. Even amongst investigators there is considerable disagreement as to what constitutes bilinguality (1,4,5,9,13) and with the additional complex variations of Spanish within the population in Denver, the following two criteria were utilized:

1. Ability of the subject to converse or respond to the investigator in Spanish.
2. Ability of the subject's parents to converse with the investigator in Spanish.

This method, of course, amounted to considerable subjectivity on the investigator's part but no other method appeared adequate at this time.

In addition to the above criteria, no child was used as a subject if he was having any particular problems in school either emotionally or educationally. In some

cases subjects came from families in which a member had been referred to some agency for such problems but the subjects themselves were not experiencing difficulties. Therefore, no subject was receiving any sort of remedial help with educational problems, psycho-therapy, or any medical treatment for physical or emotional problems. All subjects were born in the United States and all parents were citizens of the United States. Of the thirty subjects, ten were born in Denver, Colorado; 15 were born in other areas of Colorado; five were born in Texas. In all cases, these subjects had been living in Denver for one year or more.

B. Tests Employed

The following tests were administered to all subjects in the same sequence as listed. These tests were:

1. Wechsler Intelligence for Children
2. Raven's Coloured Progressive Matrices (Book Form)
3. Benton Motor Visual Test
4. Graham-Kendell Memory for Designs Test

The first two of these measures were employed because they were seen to be readily available to any organization testing Hispanoamerican children if, as we hopefully anticipated, any significant predictive factors were forthcoming in our study (2). The second two tests listed above were included as an additional check on

subjects who may have been suffering from some perceptual or psycho-motor handicap. Such subjects were not included in this sample for the abvious reason of confounding the overall results. The necessity for excluding such subjects, however, only occured in five cases.

C. Treatment of the Data

Subsequent to the administration of the above described measures, the school grades were obtained during the same grading period that the tests were given. These were easily obtained from the subjects' report cards and an average of these grades was computed and compared with the following test scores:

1. WISC Full Scale IQ Scores
2. WISC Verbal Scale IQ Scores
3. WISC Performance IQ Scores
4. Raven Coloured Progressive Matrice Scores
5. WISC Block Subtest Scores

The comparisons were done by Pearson Product Moment Correlation method. The reason for selecting the above scores for the analysis was based on information obtained in the previously mentioned study undertaken at Porter Memorial Hospital in Denver, Colorado. The comparison of the Raven test and the WISC Block Subtest was selected because of a relationship established by an earlier study of these two measures (10).

It should be remembered at this point that the grade average was attained by averaging all subjects appearing on the grade card. Consequently, the averages contained subjects dependent upon verbal skills as well as subjects possibly more related to perceptual motor skills. However, only academic subjects were utilized and physical education grades were not included for the comparisons.

Results

It can be readily seen in Table 1 that of the measures used, the Raven Progressive Coloured Matrices maintained the correlation of greatest significance with grade point average.

Table 1

Correlations of Test Responses and School Grades of 30 Bilingual Hispanoamerican Children

	Test	Correlation	Significance
1.	WISC Full Scale Scores	$\neq .190$	n. s.
2.	WISC Verbal Scale Scores	$\neq .135$	n. s.
3.	WISC Performance Scale Scores	$\neq .299$	$< .05$
4.	Raven Matrices	$\neq .512$	$< .005$
5.	WISC Block Subtest	$\neq .329$	$< .05$

Additionally it should be noted that only perceptual-motor types of functions resulted in significant correlations while WISC Verbal IQ scores were not significant. Because the Verbal IQ scores fell below average they in turn reduced Full Scale IQ Scores which were above average. The Verbal IQ averages equaled 89.0 with the Performance IQ scores averaging out to 106.0. Full Scale IQ scores averaged out to 96.0. The .05 significance for Performance IQ scores and Block Subtest scores are understandable in that (as mentioned above) they, too, involve perceptual-motor skills and as the Block Subtest is related to the Raven test (10) we do have evidence of the interrelationships of these motor types of measures.

Discussion

The most striking feature of our above correlations is that they denote a phenomenon whereby this population accomplishes educational tasks, which are more dependent upon verbal skills, by perceptual-motor functions. This interpretation is, of course, made on the basis of the significant correlation with grades and motor activities and the insignificant correlation between verbal functions and grades. These data, however, do present some intriguing questions in terms of what psychological mechanism accounts for this phenomenon. Does bilingualism short circuit a student's ability to use English so that he

makes some adjustment whereby motor skills are somehow brought into play to accomplish verbal activities? Or is there a closer connection between these two functions(3)? In the work of McFie(12) it was to be noted that damage to the left temporal area of the brain affects both verbal and motor activities. Concurrant with this investigation some interesting asides have developed in relation to bilingualism and material or motor functions herein. For instance, it was noted that 80% of the parents of the subjects of this investigation stated that they often tried to avoid using Spanish because they felt it interfered with their English. In addition, many of these parents indicated they often resorted to Spanish when they became angry or upset. Another interesting point that evolved in this study was comments made by some of the teachers of these students in reference to the use of phonics and general expressions in English. These teachers indicated that certain sounds were extremely difficult to teach Spanish-Surnamed children, especially the sound of the letter "e" in the word "tell". The Hispano child will usually pronounce the "e" in the manner that the English speaking person sounds the letter "a" in the word "talisman". Thus once the child hears this sound in his home it becomes a difficulty in school. In the realm of expressions, the Hispano child often will ask, "Can I take a drink?" In Spanish one does "take a drink," (from the verb tomar).

No doubt factors such as these have their effects upon the verbal aspects of education which is molded by the majority English speaking American population (8). From the aspect of the influence of motor skills seen in this study an additional bit of information was uncovered that appeared to support these data. A local automotive company set out to train a number of individuals from minority groups as mechanics. Initially, all members were given a written test as an ability measure. On this test the five Hispano males scored at the bottom of the total group. Yet after four months of training these same Hispano males scored at the top of the group in terms of their performance on the job.

Implications for the Use of These Data

From the results of this study the immediate indication involves one concept that is not new. This is the fact that the WISC alone or any test that rests heavily on verbal functions are not accurate measures of the ability of the Hispano children (6). The second factor of importance uncovered in this study is that the Raven test is a better measure and predictor of school success for this particular group than the other tests involved, at least, for the age group studied here. However, it is the impression of this author, that all Hispano individuals should be evaluated

with tests other than those depending upon verbal skills. Written, paper pencil tests especially should be avoided. This is probably so for age groups other than those appearing here though further studies should be undertaken to support this.

In any case, the Raven test could be utilized in the testing of Hispano children. The book form of this measure is easily administered and could be included in the general testing program within the schools for the evaluation of this group. Thus, it is recommended that this test at least be included in the present battery. It is not suggested that the Raven test replace the tests being given at present, but should be supplementary.

For the adult Hispano, further research is needed. However, it may be well for any organization that depends upon written tests as a selection procedure to explore the use of the Raven or other non-verbal tests as measures when job candidates from bilingual groups are being considered.

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